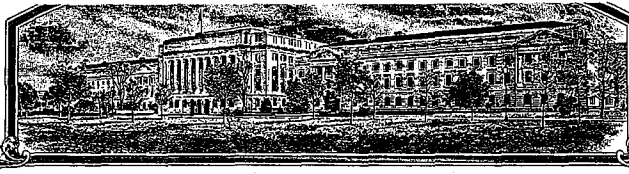


No.

200300238



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Pioneer Hi-Bred International, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR USING IT IN PRODUCING A HYBRID OR VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. (84 AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN, FIELD

'PHB18'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this nineteenth day of August, in the year two thousand and four.

Attest:

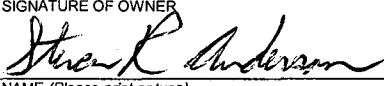


[Signature]
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

[Signature]
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
 AGRICULTURAL MARKETING SERVICE
 SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE
 APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
 (Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.
 Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER Pioneer Hi-Bred International, Inc.		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME	3. VARIETY NAME PHB18
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) 7301 NW 62nd Avenue Johnston, IA 50131-0085		5. TELEPHONE (include area code) 515/270-4051	FOR OFFICIAL USE ONLY PVPO NUMBER 200300238
		6. FAX (include area code) 515/253-2125	
7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) Corporation	8. IF INCORPORATED, GIVE STATE OF INCORPORATION IOWA	9. DATE OF INCORPORATION March 5, 1999	FILING DATE May 1, 2003
10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers) Steven R. Anderson Research and Product Development P.O. Box 85 Johnston, IA 50131-0085			FILING AND EXAMINATION FEES: \$ 3652.00 DATE 5/1/03 CERTIFICATION FEE: \$ 432.00 DATE 7/13/2004
11. TELEPHONE (Include area code) 515/270-4051	12. FAX (Include area code) 515/253-2125	13. E-MAIL steven.anderson@pioneer.com	14. CROP KIND (Common Name) CORN
15. GENUS AND SPECIES NAME OF CROP Zea Mays		16. FAMILY NAME (Botanical) Gramineae	17. IS THE VARIETY A FIRST GENERATION HYBRID? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input checked="" type="checkbox"/> Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$3,652), made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)		19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? See Section 83(a) of the Plant Variety Protection Act <input type="checkbox"/> YES (If "yes", answer items 20 and 21 below) <input checked="" type="checkbox"/> NO (If "no", go to item 22) 20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? <input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, WHICH CLASSES? <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED 21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS. <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED (If additional explanation is necessary, please use the space indicated on the reverse.)	
22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)		23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)	
24. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate. The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties			
SIGNATURE OF OWNER		SIGNATURE OF OWNER 	
NAME (Please print or type)		NAME (Please print or type) Steven R. Anderson	
CAPACITY OR TITLE	DATE	CAPACITY OR TITLE	DATE
		Research Scientist	4-28-03

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to **reproduce** the variety, or for tuber reproduced varieties verification that a viable (*in the sense that it will reproduce an entire plant*) tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for \$3,652 (\$432 filing fee and \$3,220 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice.) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfilled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$432 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office

Telephone: (301) 504-5518

FAX: (301) 504-5291

Homepage: <http://www.ams.usda.gov/science/pvpo/pvp.htm>

ITEM

- 18a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
(1) identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 18c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 18e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
19. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See Regulations and Rules of Practice, Section 97.103).
20. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
21. See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.

1. **CONTINUED FROM FRONT** (Please provide a statement as to the limitation and sequence of generations that may be certified.)

2. **CONTINUED FROM FRONT** (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)

United States, Turkey, Nov. 1, 2002.

3. **CONTINUED FROM FRONT** (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center--East, Beltsville, MD 20705. Telephone: (301) 504-8089. <http://www.ams.usda.gov/lsg/seed.htm>

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 3.0 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, marital or family status, political beliefs, parental status, or protected genetic information. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

ST-470 (02-10-2003) designed by the Plant Variety Protection Office with Word 2000. Replaces former versions of STS-470, which are obsolete.

Exhibit A. Origin and Breeding History

Pedigree: PH1B5/PH2BB)CX42211

Pioneer Line PHB18, *Zea mays L.*, a flint-dent corn inbred, was developed by Pioneer Hi-Bred International, Inc. from the single cross hybrid PH1B5 (Certificate No. 9800355) X PH2BB using the pedigree method of plant breeding. Varieties PH1B5 and PH2BB are proprietary inbred lines of Pioneer Hi-Bred International, Inc. Variety PH2BB was derived by pedigree selection from the single cross hybrid PHR03 (PVP Certificate No. 9100097) X PHBE2 (PVP certificate No. 9500200).

Selfing was practiced from the above hybrid for 7 generations using pedigree selection. During line development, crosses were made to inbred testers for the purpose of estimating the line's combining ability. Yield trials were grown at Garden City, Kansas as well as other Pioneer research locations. After initial testing, additional hybrid combinations have been evaluated and subsequent generations of the line have been grown and hand-pollinated with observations again made for uniformity.

Variety PHB18 has shown uniformity and stability for all traits as described in Exhibit C - "Objective Description of Variety". It has been self-pollinated and ear-rowed 5 generations with careful attention paid to selection criteria and uniformity of plant type to assure genetic homozygosity and phenotypic stability. The line has been increased both by hand and in isolated fields with continued observations for uniformity and stability, and for 3 generations during the final stages of inbred development and seed multiplication. Very high standards for genetic purity have been established morphologically using field observations and electrophoretically using sound lab molecular marker methodology.

No variant traits have been observed or are expected in PHB18.

The criteria used in the selection of PHB18 were yield, both per se and in hybrid combinations; late season plant health, grain quality, stalk lodging resistance, and kernel size, especially important in production. Other selection criteria include: ability to germinate in adverse conditions; disease and insect resistance; pollen yield and tassel size.

Exhibit A: Developmental history for PHB18

Season/Year Pedigree Grown	Inbreeding Level of Pedigree Grown
PH1B5	F0
PH2BB	F0
PH1B5/PH2BB WINTER 1996	F1
PH1B5/PH2BB)CX SUMMER 1997	F2
PH1B5/PH2BB)CX4 SUMMER 1998	F3
PH1B5/PH2BB)CX41 WINTER 1998	F4
PH1B5/PH2BB)CX412 SUMMER 1999	F5
PH1B5/PH2BB)CX4121 WINTER 1999	F6
PH1B5/PH2BB)CX41211 SUMMER 2000	F7
PH1B5/PH2BB)CX41211X	F8

*PHB18 was selfed and ear-rowed from F3 through F7 generation.

#Uniformity and stability were established from F5 through F7 generation and beyond when seed supplies were increased.

Exhibit B: Novelty Statement

Variety PHB18 mostly resembles Pioneer Hi-Bred International, Inc. proprietary inbred line PHBE2 (PVP Certificate No. 9600201). Tables 1A and 1B show two sample t-tests on data collected primarily in Johnston, and Dallas Center, IA. The traits collectively show measurable differences between the two varieties.

Exhibit B: Novelty Statement

Variety PHB18 has a greater husk length (23.5 cm vs 19.3 cm) than variety PHBE2 (Table 1A, 1B).

Variety PHB18 has a greater husk extension length (4.8 cm vs 1.8 cm) than variety PHBE2 (Table 1A, 1B).

Variety PHB18 has a greater leaf length (85.2 cm vs 64.8 cm) than variety PHBE2 (Table 1A, 1B).

Variety PHB18 has a greater shank length (17.6 cm vs 10.6 cm) than variety PHBE2 (Table 1A, 1B).

Variety PHB18 has fewer primary tassel branches (8.5 vs 13.2) than variety PHBE2 (Table 1A, 1B).

Exhibit B: Novelty Statement Tables

Table 1A: Data from Johnston and Dallas Center, IA broken out by year and across environments are supporting evidence for differences between PHB18 and PHBE2. Each year varieties were grown in 3 locations that had different environmental conditions. Environments had different planting dates and were in different fields. A two-sample t-test was used to compare differences between means.

TRAIT	YEAR	VARIETY -1	VARIETY -2	Count- 1	Count- 2	Mean-1	Mean-2	Mean Diff	StdDeviat ion-1	StdDeviat ion-2	StdError- 1	StdError- 2	DF_Po oled	t- Value_Po oled	Prob_(2- tail)_Pooled
husk length (cm)	2001	PHB18	PHBE2	15	15	23.3	18.7	-4.5	1.870	1.580	0.483	0.408	28	-7.2	0.000
husk length (cm)	2002	PHB18	PHBE2	15	15	23.7	19.9	-3.8	1.047	0.990	0.270	0.256	28	-10.2	0.000
husk extension length (cm)	2001	PHB18	PHBE2	15	15	4.6	1.5	3.1	1.957	0.990	0.505	0.256	28	5.4	0.000
husk extension length (cm)	2002	PHB18	PHBE2	15	15	4.9	2.0	2.9	2.017	1.134	0.521	0.293	28	4.9	0.000
leaf length (cm)	2001	PHB18	PHBE2	15	15	86.2	67.3	18.9	5.267	6.552	1.360	1.692	28	8.7	0.000
leaf length (cm)	2002	PHB18	PHBE2	15	15	84.1	62.3	21.9	4.549	4.728	1.175	1.221	28	12.9	0.000
shank length (cm)	2001	PHB18	PHBE2	15	15	17.1	9.7	7.3	3.731	3.173	0.963	0.819	28	5.8	0.000
shank length (cm)	2002	PHB18	PHBE2	15	15	18.1	11.5	6.5	3.081	3.758	0.796	0.970	28	5.2	0.000
tassel primary branch (# of primary branches)	2001	PHB18	PHBE2	15	15	8.3	13.3	-5.1	1.944	3.266	0.502	0.843	28	-5.2	0.000
tassel primary branch (# of primary branches)	2002	PHB18	PHBE2	15	15	8.7	13.1	-4.3	1.668	1.907	0.431	0.492	28	-6.6	0.000

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Exhibit B. Novelty Statement Tables

Table 1B: Summary data from Johnston and Dallas Center, IA across years and environments are supporting evidence for differences between PHB18 and PHBE2. Environments had different planting dates and were in different fields. A two-sample t-test was used to compare differences between means.

TRAIT	VARIETY-1	VARIETY-2	Count-1	Count-2	Mean-1	Mean-2	Mean_Diff	StdDeviation-1	StdDeviation-2	StdError-1	StdError-2	DF_Pooled	t-Value_Pooled	Prob (2-tail)_Pooled
husk length (cm)	PHB18	PHBE2	30	30	23.5	19.3	-4.2	1.502	1.418	0.274	0.259	58	-11.0	0.000
husk extension length (cm)	PHB18	PHBE2	30	30	4.8	1.8	-3.0	1.960	1.073	0.358	0.196	58	-7.4	0.000
leaf length (cm)	PHB18	PHBE2	30	30	85.2	64.8	20.4	4.949	6.163	0.903	1.125	58	14.1	0.000
shank length (cm)	PHB18	PHBE2	30	30	17.6	10.6	6.9	3.401	3.538	0.621	0.646	58	7.7	0.000
tassel primary branch (# of primary branches)	PHB18	PHBE2	30	30	8.5	13.2	-4.7	1.796	2.631	0.328	0.480	58	-8.1	0.000

2003 00238

United States Department of Agriculture, Agricultural Marketing Service
 Science and Technology, Plant Variety Protection Office
 National Agricultural Library Building, Room 400
 Beltsville, MD 20705-2351

OBJECTIVE DESCRIPTION OF VARIETY
 CORN (Zea mays L.)

Name of Applicant(s) Variety Name or Temporary Designation:
Pioneer Hi-Bred International, Inc **PHB18**

Address (Street & No., or R.F.D. No., City, State, Zip Code and Country) **FOR OFFICIAL USE** PVPO Number

**7301 NW 62nd Avenue, P.O. Box 85,
 Johnston, Iowa 50131-0085**

200300238

Place the appropriate number that describes the varietal characters typical of this inbred variety in the spaces below. Right justify whole numbers by adding leading zeroes if necessary. Completeness should be striven for to establish an adequate variety description. Traits designated by a "*" are considered necessary for an adequate variety description and must be completed.

COLOR CHOICES (Use in conjunction with Munsell color code to describe all color choices; describe #25 and # 26 in comments section)

01=Light Green	06=Pale Yellow	11=Pink	16=Pale Purple	21=Buff	26=Other (Describe)
02=Medium Green	07=Yellow	12=Light Red	17=Purple	22=Tan	
03=Dark Green	08=Yellow-Orange	13=Cherry Red	18=Colorless	23=Brown	
04=Very Dark Green	09=Salmon	14=Red	19=White	24=Bronze	
05=Green-Yellow	10=Pink-Orange	15=Red & White	20=White Capped	25=Variegated	

STANDARD INBRED CHOICES (Use the most similar (in back ground and maturity) of these to make comparisons based on grow-out trial data):

Yellow Dent Families:

Family	Members
B14	CM105, A632, B64, B68
B37	B37, B76, H84
B73	N192, A679, B73, NC268
C103	Mo17, Va102, Va35, A682
Ch43	A619, MS71, H99, Va26
WF9	W64A, A554, A654, Pa91

Yellow Dent (Unrelated):

Co109, ND246,
 Oh7, T232
 W117, W153R
 W182BN
 White Dent
 C166, H105, Ky228

Sweet Corn:

C13, Iowa 5125, P39, 2132

Popcorn

SG1533, 4722, HP301, HP7211

Pipecorn:

Mo15W, Mo16W, Mo24W

Application Variety Data

PHB18

Standard Inbred Data

B73

1. TYPE: (describe intermediate types in comments sect.)

3 (1=Sweet 2=Dent 3=Flint 4=Flour 5=Pop

6=Ornamental 7=Pipecorn)

Comments: Flint-Dent

2

Stand. Seed Source

PI 550473

2. REGION WHERE DEVELOPED IN THE U.S.A.:

5 (1=N.West 2=N.Central 3=N.East 4=S. East 5=S.

Central, 6=S. West, 7=Other)

____Region

Application Variety Data

Page 1

Standard Variety Data

PHB18

B73

Application Variety Data **PHB18****B73** Standard Inbred Data

3. MATURITY:

Days	Heat Units		Days	Heat Units	
<u>069</u>	<u>1,586.0</u>	From emergence to 50% of plants in silk	<u>65</u>	<u>1,486.3</u>	
<u>67</u>	<u>1,541.2</u>	From emergence to 50% of plants in pollen	<u>64</u>	<u>1,433.3</u>	
<u>3</u>	<u>92.8</u>	From 10% to 90% pollen shed	<u>2</u>	<u>55.5</u>	
		From 50% silk to optimum edible quality			
		From 50% silk to harvest at 25% moisture			

4. PLANT:

	St.Dev	S.Size	Avg.	St.Dev	S.Size
<u>244.6</u> cm Plant Height (to tassel tip)	<u>20.17</u>	<u>30</u>	<u>233.2</u>	<u>14.48</u>	<u>30</u>
<u>95.7</u> cm Ear Height (to base of top ear node)	<u>10.85</u>	<u>30</u>	<u>93.6</u>	<u>09.99</u>	<u>30</u>
<u>16.9</u> cm Length of Top Ear Internode	<u>2.19</u>	<u>30</u>	<u>15.3</u>	<u>1.93</u>	<u>30</u>
<u>0.0</u> Average Number of Tillers/plant	<u>0.02</u>	<u>6</u>	<u>0.0</u>	<u>0.02</u>	<u>6</u>
<u>0.9</u> Average Number of Ears per Stalk	<u>0.11</u>	<u>6</u>	<u>1.0</u>	<u>0.08</u>	<u>6</u>
<u>4</u> Anthocyanin of Brace Roots: 1=Absent 2=Faint, 3=Moderate, 4=Dark			<u>3</u>		

5. LEAF:

	St.Dev	S.Size	Avg.	St.Dev	S.Size
<u>10.0</u> cm Width of Ear Node Leaf	<u>1.07</u>	<u>30</u>	<u>9.4</u>	<u>1.13</u>	<u>30</u>
<u>85.2</u> cm Length of Ear Node Leaf	<u>4.95</u>	<u>30</u>	<u>82.3</u>	<u>3.03</u>	<u>30</u>
<u>6</u> Number of leaves above top ear	<u>0.65</u>	<u>30</u>	<u>6</u>	<u>0.89</u>	<u>30</u>
<u>19</u> Degrees Leaf Angle (measure from 2nd leaf above ear at anthesis to stalk above leaf)	<u>4.36</u>	<u>30</u>	<u>18</u>	<u>4.09</u>	<u>30</u>
<u>3</u> Leaf Color (Munsell code)*	<u>5GY34</u>		<u>3</u>	<u>7.5GY34</u>	
<u>2</u> Leaf Sheath Pubescence (Rate on scale from 1=none to 9=like peach fuzz)			<u>3</u>		

6. TASSEL:

	St.Dev	S.Size	Avg	St.Dev	S.Size
<u>9</u> Number of Primary Lateral Branches	<u>1.80</u>	<u>30</u>	<u>7.1</u>	<u>1.42</u>	<u>30</u>
<u>32</u> Branch Angle from Central Spike	<u>7.90</u>	<u>30</u>	<u>15.8</u>	<u>7.27</u>	<u>30</u>
<u>57.5</u> cm Tassel Length (from top leaf collar node to tassel tip)	<u>4.70</u>	<u>30</u>	<u>57.6</u>	<u>4.96</u>	<u>30</u>
<u>6</u> Pollen Shed (0=male sterile to 9=heavy shed)			<u>6</u>		
<u>1</u> Anther Color (Munsell code)*	<u>2.5GY76</u>		<u>07</u>	<u>5Y8.54</u>	
<u>1</u> Glume Color (Munsell code)*	<u>7.5GY46</u>		<u>1</u>	<u>5GY56</u>	
<u>1</u> Bar Glumes (Glume Bands): 1=Absent 2=Present			<u>1</u>		

Application Variety Data

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Standard Inbred Data

Note: Use chart on first page to choose color codes for color traits

*Munsell Glossy Book of Color (a standard color reference) Kollmorgen Inst. Corp. New Windsor NY.

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Application Variety Data **PHB18****B73** Standard Inbred Data

7a. EAR (Unhusked Data):			St.Dev	S. Size	Avg.	St.Dev	S.Size
<u>14</u>	Silk Color *	(3 days after emergence)	<u>2.5R</u>	<u>48</u>	<u>1</u>	<u>2.5GY</u>	<u>94</u>
<u>1</u>	Fresh Husk Color*	(25 days after 50% silking)	<u>2.5GY</u>	<u>76</u>	<u>1</u>	<u>5GY</u>	<u>78</u>
<u>21</u>	Dry Husk Color*	(65 days after 50% silking)	<u>5Y</u>	<u>91</u>	<u>21</u>	<u>2.5Y</u>	<u>8.54</u>
<u>2</u>	Position of Ear	(1=Upright, 2=Horizontal, 3=Pendant)			<u>2</u>		
<u>5</u>	Husk Tightness	(1=very loose to 9=very tight)			<u>6</u>		
<u>2</u>	Husk Extension:	(at harvest): 1=Short (ears exposed), 2=Medium (<8cm), 3=Long (8-10cm beyond ear tip), 4=Very Long (>10cm).			<u>3</u>		

7b. EAR (Husked Ear Data):			St.Dev.	S.Size	Avg	St.Dev	S.Size
<u>16.7</u>	cm Ear Length		<u>1.47</u>	<u>30</u>	<u>13.3</u>	<u>1.67</u>	<u>30</u>
<u>44.2</u>	mm Ear Diameter at mid-point		<u>2.47</u>	<u>30</u>	<u>44.8</u>	<u>2.41</u>	<u>30</u>
<u>137.2</u>	gm Ear Weight		<u>29.89</u>	<u>30</u>	<u>111.2</u>	<u>28.55</u>	<u>30</u>
<u>17</u>	Number of Kernel Rows		<u>1.34</u>	<u>30</u>	<u>17.6</u>	<u>1.43</u>	<u>30</u>
<u>2</u>	Kernel Rows: 1=Indistinct 2=Distinct				<u>2</u>		
<u>2</u>	Row Alignment: 1=Straight 2=Slightly Curved 3=Spiral				<u>2</u>		
<u>17.6</u>	cm Shank Length		<u>3.40</u>	<u>30</u>	<u>8.6</u>	<u>3.26</u>	<u>30</u>
<u>2</u>	Ear Taper: 1=Slight cylindrical, 2= Average slightly conical, 3=Extreme conical.				<u>2</u>		

8. KERNEL (Dried)			St.Dev.	S.Size	Avg.	St.Dev.	S.Size
<u>10.7</u>	mm Kernel Length		<u>0.78</u>	<u>30</u>	<u>10.8</u>	<u>0.68</u>	<u>30</u>
<u>8.1</u>	mm Kernel Width		<u>0.76</u>	<u>30</u>	<u>7.1</u>	<u>0.45</u>	<u>30</u>
<u>4.9</u>	mm Kernel Thickness		<u>0.52</u>	<u>30</u>	<u>3.8</u>	<u>0.53</u>	<u>30</u>
<u>52.9</u>	% Round Kernels (Shape Grade)		<u>18.02</u>	<u>5</u>	<u>24.5</u>	<u>8.78</u>	<u>5</u>
<u>1</u>	Aleurone Color Pattern:				<u>.1</u>		
	(1=Homozygous, 2=Segregating)						
<u>08</u> <u>7</u>	Aleurone Color (Munsell code)*		<u>7.5YR</u>	<u>714</u>	<u>07</u> <u>8</u>	<u>2.5Y</u>	<u>812</u>
<u>08</u> <u>7</u>	Hard Endosperm Color (Munsell C)*		<u>7.5YR</u>	<u>716</u>	<u>7</u>	<u>10YR</u>	<u>712</u>
<u>3</u>	Endosperm Type:				<u>3</u>		
	1=Sweet (Su1) 2=Extra Sweet (sh2) 3=Normal Starch, 4=High Amylose Starch, 5=Waxy Starch, 6=High Protein, 7=High Lysine, 8=Super Sweet (se), 9=High Oil, 10=Other						
<u>29.0</u>	gm Weight per 100 Kernels (Unsize sample)		<u>2.92</u>	<u>5</u>	<u>20.8</u>	<u>3.35</u>	<u>5</u>

9. COB:							
<u>27.5</u>	mm Cob Diameter at mid-point		<u>1.25</u>	<u>30</u>	<u>28.3</u>	<u>1.68</u>	<u>30</u>
<u>11</u>	Cob Color (Munsell code)*		<u>10R</u>	<u>56</u>	<u>11</u>	<u>10R</u>	<u>66</u>

Application Variety Data

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Standard Inbred Data

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EXHIBIT C:

(Corn; Maize) (8-22-2001)

Application Variety Data

Standard Inbred Data

PHB18**B73**

10. DISEASE RESISTANCE:(1-most susceptible to 9-most resistant,			
Leave blank if not tested, Leave race or strain options blank if			
polygenic)			
A. LEAF BLIGHTS, WILTS, AND LOCAL INFECTION DISEASES			
___ Anthracnose Leaf Blight (<i>Colletotrichum graminicola</i>)			___
___ Common Rust (<i>Puccinia sorghi</i>)			
___ Common Smut (<i>Ustilago maydis</i>)			___
___ Eyespot (<i>Kabatiella zeae</i>)			
___ Gross's Wilt (<i>Clavibacter michiganense</i> spp. <i>nebraskense</i>)			
4 Gray Leaf Spot (<i>Cercospora zeae-maydis</i>)			3
___ Helminthosporium Leaf Spot (<i>Bipolaris zeicola</i>) Race:			___
6 Northern Leaf Blight (<i>Exserohilum turcicum</i>) Race:			3
___ Southern Leaf Blight (<i>Bipolaris maydis</i>) Race:			
4 Southern Rust (<i>Puccinia polysora</i>)			2
5 Stewart's Wilt (<i>Erwinia stewartii</i>)			2
___ Other (Specify):_____			___
B. SYSTEMIC DISEASES			
___ Corn Lethal Necrosis (MCMV and MDMV)			
___ Head Smut (<i>Sphacelotheca reiliana</i>)			
___ Maize Chlorotic Dwarf Virus (MDV)			___
___ Maize Chlorotic Mottle Virus (MCMV)			___
___ Maize Dwarf Mosaic Virus (MDMV)			
___ Sorghum Downy Mildew of Corn (<i>Peronosclerospora sorghi</i>)			___
___ Other (Specify):_____			___
C. STALK ROTS			
5 Anthracnose Stalk Rot (<i>Colletotrichum graminicola</i>)			3
___ Diplodia Stalk Rot (<i>Stenocarpella maydis</i>)			___
___ Fusarium Stalk Rot (<i>Fusarium moniliforme</i>)			___
___ Gibberella Stalk Rot (<i>Gibberella zeae</i>)			___
___ Other (Specify):_____			___
D. EAR AND KERNEL ROTS			
___ Aspergillus Ear and Kernel Rot (<i>Aspergillus flavus</i>)			___
8 Diplodia Ear Rot (<i>Stenocarpella maydis</i>)			2
4 Fusarium Ear and Kernel Rot (<i>Fusarium moniliforme</i>)			6
___ Gibberella Ear Rot (<i>Gibberella zeae</i>)			
___ Other (Specify):_____			___
___			___

Application Variety Data

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Standard Inbred Data

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EXHIBIT C:

(Corn; Maize)

(8-22-2001)

20030023

Application Variety Data

Standard Inbred Data

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11. INSECT RESISTANCE: (1-most susceptible to 9-most resistant)		
___ Banks Grass Mite (<i>Oligonychus pratensis</i>)		___
___ Corn Earworm (<i>Helicoverpa zea</i>)		___
___ Leaf Feeding		___
___ Silk Feeding ___ . ___ mg larval wt.		___
___ Ear Damage		___
___ Corn Leaf Aphid (<i>Rhopalosiphum maidis</i>)		___
___ Corn Sap Beetle (<i>Capophilus dimidiatus</i>)		___
___ European Corn Borer (<i>Ostrinia nubilalis</i>)		___
1st. Generation (Typically whorl leaf feeding)		
2nd. Generation (Typically leaf sheath-collar feeding)		
___ Stalk Tunneling ___ . ___ cm tunneled/plant		___
___ Fall Armyworm (<i>Spodoptera frugiperda</i>)		___
___ Leaf Feeding		___
___ Silk Feeding: ___ , ___ mg larval wt.		___
___ Maize Weevil (<i>Sitophilus zea maize</i>)		___
___ Northern Rootworm (<i>Diabrotica barberi</i>)		___
___ Southern Rootworm (<i>Diabrotica undecimpunctata</i>)		___
___ Southwestern Corn Borer (<i>Diatraea grandiosella</i>)		___
___ Leaf Feeding		___
___ Stalk Tunneling ___ . ___ cm tunneled/plant		___
___ Two-spotted Spider Mite (<i>Tetranychus utricae</i>)		___
___ Western Rootworm (<i>Diabrotica virgifera virgifera</i>)		___
___ Other (Specify) _____		___
12. AGRONOMIC TRAITS:		
<u>5</u> Staygreen (at 65 days after anthesis; rate from 1-worst to excellent)		<u>2</u>
___ % Dropped Ears (at 65 days after anthesis)		___
___ % Pre-anthesis Brittle Snapping		___
<u>22</u> % Pre-anthesis Root Lodging		<u>2</u>
___ % Post-anthesis Root Lodging (at 65 days after anthesis)		___
___ % Post-anthesis Stalk Lodging		___
<u>4,805.0</u> Kg/ha Yield of inbred per se (at 12-13% grain moisture)		<u>5,177.0</u>
13 MOLECULAR MARKERS: (0-data unavailable; 1-data available but not supplied; 2-data supplied)		___
Isozymes <u>1</u> RFLP's RAPD's		

Application Variety Data

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Standard Inbred Data

PHB18

B73

COMMENTS: (eg. state how heat units were calculated, standard inbred seed source, and/or where data was collected. Continue in exhibit D)

Please note the data presented in Exhibit B and C, "Objective Description of Variety," are collected primarily at Johnston and Dallas Center, Iowa. The data in Tables 1A and 1B are from two sample t-tests using data collected in Johnston and Dallas Center, IA. These traits in exhibit B collectively show distinct differences between the two varieties.

JMS 10/31/03

The data collected in exhibit C was collected in 2001 and 2002 for page 1 and 2. There were 3 different planting dates planted for these trials. There are environmental factors that differ from year to year and from planting date to planting date. Environmental temperature and precipitation differences during the vegetative and grain fill periods can impact plant and grain traits, and are a source of variability. The environmental conditions described above could result in larger standard deviations. The variation associated with environment to environment is normally higher than the variation associated within locations. Also, the ear and sizing traits can vary depending on how well pollinated the ears are and how consistent the weather is during the grain fill period. I have enclosed a table that shows monthly temperature and precipitation in 2001 and 2002.

^C
Exhibit ~~D~~. Temperature and Precipitation differences from Ankeny, IA

TEMPERATURE

YEAR	MAY	JUN	JULY	AUG	AVERAGE
1994	59.8	70.7	71.9	69.0	67.9
1995	56.2	69.4	74.3	76.9	69.2
1996	56.2	69.3	71.3	70.5	66.8
1997	53.5	70.6	74.1	69.6	67.0
1998	64.7	66.6	74.8	73.5	69.9
1999	60.7	69.7	78.7	70.5	69.9
2000	63.5	68.9	73.2	74.2	70.0
2001	61.3	69.0	76.7	74.2	70.3
2002	57.7	73.5	77.9	71.7	70.2

RAINFALL

YEAR	MAY	JUN	JULY	AUG	Total
1994	3.67	5.75	1.71	4.18	15.31
1995	5.04	4.19	2.94	2.87	15.04
1996	8.47	4.35	2.51	2.14	17.47
1997	4.32	3.27	4.10	1.36	13.05
1998	6.46	11.07	5.70	4.96	28.19
1999	6.46	4.54	4.45	6.55	21.85
2000	5.40	5.80	3.16	1.78	16.14
2001	5.72	3.87	2.05	1.92	13.56
2002	2.91	2.78	5.34	4.00	15.03

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

1. NAME OF APPLICANT(S) PIONEER HI-BRED INTERNATIONAL, INC.	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME PHB18
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) 7301 NW 62nd AVENUE P.O. BOX 85 JOHNSTON, IA 50131-0085	5. TELEPHONE (include area code) 515-270-4051	6. FAX (include area code) 515-253-2125
	7. PVPO NUMBER 200300238	

8. Does the applicant own all rights to the variety? Mark an "X" in appropriate block. If no, please explain: ☒ YES ☐ NO

9. Is the applicant (individual or company) a U.S. national or U.S. based company? ☒ YES ☐ NO

If no, give name of country

10. Is the applicant the original owner? ☒ YES ☐ NO If no, please answer one of the following:

a. If original rights to variety were owned by individual(s), is(are) the original owner(s) a U.S. national(s)?

☐ YES ☐ NO if no, give name of country

b. If original rights to variety were owned by a company(ies), is(are) the original owner(s) a U.S. based company?

☒ YES ☐ NO If no, give name of country

11. Additional explanation on ownership (if needed, use reverse for extra space):

PHB18 is owned by Pioneer Hi-Bred International, Inc.

Pioneer Hi-Bred International, Inc. (PHI), Des Moines, Iowa, and/or its wholly owned subsidiary Pioneer Overseas Corporation (POC), Des Moines, Iowa, is the employer of the plant breeders involved in the selection and development of PHB18. Pioneer Hi-Bred International and/or Pioneer Overseas Corporation has the sole rights and ownership of PHB18 pursuant to written contracts that assign all rights in the variety to PHI and/or POC at the time such variety was created. Individuals do not retain any rights to this variety.

PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country Which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed final breeding. See section 41(a)(2) of the Plant Variety Protection Act for definition.

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